REMARKS

Reconsideration and allowance of the present patent application based on the following remarks are respectfully requested.

By this Amendment, claims 1, 19, 26, 34, 36 and 39 are amended. No new matter has been added. Accordingly, after entry of this Amendment, claims 1-47 will remain pending in the patent application.

Claim Rejections – 35 USC §103

Claims 1-5, 8-15, and 18 were rejected under 35 U.S.C. §103(a) based on U.S. Pub. No. 2005/0088969 to Carlsen *et al.* (hereinafter "Carlsen") in view of U.S. Pat. No. 7,286,552 to Gupta *et al.* (hereinafter "Gupta"). Applicant respectfully traverses this rejection for at least the following reasons.

Claim 1 recites, *inter alia*, "when congestion is detected at a first ingress or egress port, sending a message to an upstream port connected to the first ingress or egress port indicating that congestion has occurred at a particular port and requesting storage at the upstream port of data packets destined for that port ; and, in dependence on the amount of data packets destined for the congested port stored at said upstream port, sending from the upstream port to a further upstream port a message informing said further upstream port of the congestion at the first ingress or egress congested port, said further upstream port storing at said further upstream port data packets destined for the first ingress or egress congested port."

There is no suggestion in either Carlsen or Gupta of such an arrangement.

Indeed, both Carlsen and Gupta rely on single stage congestion notification and therefore are prone to the sorts of problems described, for example, in the present application at paragraphs [0005] to [0011] of the specification. In addition, a description of a local explicit congestion notification protocol is provided in paragraphs [0077] and [0078] of the specification. As explained in paragraph [0078] with reference to Fig. 3 of the present application, when congestion is detected at port 0 of switch 10 (the switch on the right hand side of the figure) a notification is sent to port 0 of switch 8 telling that port to stop sending data to switch 10 that is destined for port 0 of switch 10. If port 0 of switch 8 subsequently becomes congested it sends a similar notification to, for example, port 0 of switch 6 which blocks data from all input ports A to C of switch 6 intended for port 0 of switch 8. Thus, data

unrelated to the congestion, such as from port B of switch 6 to port 1 of switch 10 via port 0 of each of switches 6 and 8, is also blocked. As a result, a congestion tree can develop.

In contrast, as can be understood, for example, with reference to Fig. 5 of the present application, using Regional Explicit Congestion Notification (RECN), other traffic to switch C (e.g. port 1) is not blocked at switch B. In other words, by propagating upstream information about congestion at an original port, the avoidance of the establishment of congestion fees can be achieved. In one embodiment, this can be achieved by the use of set-aside queues and cold queues for data, in which the type of queue in which data is stored is determined depending upon its destination.

Carlsen discloses a congestion notification mechanism that provides a congestion status for all destinations in a switch at each ingress port. The system is predominantly described with reference to a fiber channel switch and fabric. As stated at the bottom of paragraph [0009] in Carlsen, "if a destination port becomes congested, the flow control process determines which virtual channel on the ISL (Interswitch link) is affected, and sends an XOFF message so informing the upstream switch. The upstream switch will then stop sending data on the affected virtual channel."

Therefore, Carlsen relates to a local explicit congestion notification system (LECN). In paragraph [0034] of Carlsen, it is described that the ingress memory subsystem assigns a received frame a packet ID or "PID", that indicates the cell buffer address in the ingress memory subsystem where the packet is stored. In addition, in paragraph [0068], Carlsen describes how, if a particular data frame encounters a congested port within the downstream switch, the switch is able to communicate that congestion to the upstream switch by performing flow control for the virtual channel assigned to the virtual input queue. Furthermore, in paragraph [0073] in Carlsen, it is described how the flow control works in dependence on the occupancy of an output queue and in particular when a threshold is reached, an XOFF signal is generated to stop transmission of data from the ingress memory subsystem to the output queues in question. In paragraph [0088] in Carlsen, it is described the congestion notification methodology used. Specifically, an XOFF mask 408 is used which contains a separate status bit for all destinations within the switch, and each port has its own XOFF mask.

The Examiner acknowledges that Carlsen does not disclose that in dependence on the amount of data packets destined for the congested port stored at the upstream port, a message is sent from the upstream port to a further upstream port informing the further upstream port

of congestion at the congested port, the further upstream port storing at the further upstream port data packets destined for the congested port. The Examiner, however, contends that Gupta discloses sending from the upstream port to the further upstream port a message notifying the further upstream port of congestion at the downstream port. Applicant respectfully disagrees.

Gupta relates generally to backplane style switches in which plural blades are arranged coupled to a backplane. Data is passed between the blades via the backplane. An example of such a switch is given as a router (see, col. 1, lines 52 to 53 in Gupta). Gupta, in col. 2, lines 43 to 44, explains the problems of buffering data packets. The cost of memory is also cited in Gupta.

The system of Gupta operates by using an egress queue manager 106 generating congestion messages to an ingress queue manager 108 to cause the ingress queues 110 responsible for causing congestion to slow down the rate at which packets are de-queued to the congested egress queues. Specifically, as stated in col. 7, lines 18 to 22 in Gupta, "when the egress queue 112 that is exceeding the upper queue threshold is a backplane queue 112B, then the egress queue manager 106 sends the congestion messages 124 across the backplane to the other blades on the router 100 to cause the egress and ingress queue managers on those blades to take similar action to cause the ingress queues responsible for causing the congestion to the backplane queue 112B to slow down their packet rate."

Since the system of Gupta is a router in which blades are connected to a backplane, there is a distinction drawn between "outer queues" and "backplane queues." Outer queues are queues that connect a blade to an external component and backplane queues are queues for holding data to be routed across the backplane.

The Examiner refers to col. 8, lines 11 to 22 in Gupta and contends that Gupta discloses that depending on the amount of data packets destined for the congested port stored at the upstream port, the system in Gupta sends from the upstream port to a further upstream port a message informing the further upstream port of the congestion at the congested port. To support this, the Examiner refers to column 8, lines 41 to 47 where it is stated that "when the traffic for the sub channel to the destination blade causing the congestion, e.g. blade 4, is exceeding its capacity, then eventually some other backplane queue on another blade will become congested, and the egress queue manager on that blade will send a new congestion message to all of the other blades." (emphasis added). Applicant respectfully disagrees.

Gupta merely provides another example of a local congestion notification system. Gupta does not disclose, teach or suggest a regional congestion notification system. The portions in Gupta the Examiner is referring to, state that another backplane queue on another blade will become congested and that the egress queue manager on that blade will send a new congestion message to all of the other blades. This "new congestion message" is in respect of the congestion on the upstream port and not relating to congestion at the downstream port as required in claim 1. This feature distinguishes between a LECN methodology disclosed in Gupta and a RECN methodology as claimed in claim 1.

Gupta does not disclose, teach or suggest, *inter alia*, "in dependence on the amount of data packets destined for the congested port stored at said upstream port, sending from the upstream port to a further upstream port a message informing said further upstream port of the congestion at the first ingress or egress congested port, said further upstream port storing at said further upstream port data packets destined for the first ingress or egress congested port," as recited in claim 1.

Consequently, neither Carlsen nor Gupta, taken alone or in combination disclose, teach or suggest the subject matter recited in claim 1. Therefore, Applicant respectfully submits that claim 1 is patentable over the purported combination of Carlsen and Gupta.

Claim 2-5, 8-15 and 18 depend from claim 1. Therefore, claims 2-5, 8-15 and 18 are also patentable by virtue of their dependence on claim 1 and for the additional subject matter recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 1-5, 8-15, and 18 under 35 U.S.C. §103(a) over the purported combination of Carlsen and Gupta are respectfully requested.

Claims 6-7 were rejected under 35 U.S.C. §103(a) based on Carlsen in view of EP Pub. No. 1 271 856 to Pauwels et al. (hereinafter "Pauwels"). Applicant respectfully traverses this rejection for at least the following reasons.

Claims 6 and 7 depend from claim 1. Therefore, claims 6 and 7 are also patentable over Carlsen.

Pauwels fails to overcome the deficiencies noted above in Carlsen. Pauwels was relied upon as allegedly disclosing de-allocating the one-or more set aside queues in dependence on one or more criteria. Pauwels does not disclose, teach or suggest, *inter alia*, "in dependence on the amount of data packets destined for the congested port stored at said

upstream port, sending from the upstream port to a further upstream port a message informing said further upstream port of the congestion at the first ingress or egress congested port, said further upstream port storing at said further upstream port data packets destined for the first ingress or egress congested port," as recited in claim 1.

Consequently, neither Carlsen nor Pauwels, alone or in combination disclose, teach or suggest the subject matter recited in claims 6 and 7. Therefore, Applicant respectfully submits that claims 6 and 7 are patentable over the purported combination of Carlsen and Pauwels.

Accordingly, reconsideration and withdrawal of the rejection of claims 6-7 under 35 U.S.C. §103(a) over the purported combination of Carlsen and Pauwels are respectfully requested.

Claims 16-17 were rejected under 35 U.S.C. §103(a) based on Carlsen in view of Pauwels. Applicant respectfully traverses this rejection for at least the following reasons.

Claims 16 and 17 depend from claim 1. Therefore, claims 16 and 17 are also patentable over Carlsen.

As stated above with respect to claims 6 and 7, Pauwels does not disclose, teach or suggest, *inter alia*, "in dependence on the amount of data packets destined for the congested port stored at said upstream port, sending from the upstream port to a further upstream port a message informing said further upstream port of the congestion at the first ingress or egress congested port, said further upstream port storing at said further upstream port data packets destined for the first ingress or egress congested port," as recited in claim 1.

Consequently, neither Carlsen nor Pauwels, alone or in combination disclose, teach or suggest the subject matter recited in claims 16 and 17. Therefore, Applicant respectfully submits that claims 16 and 17 are patentable over the purported combination of Carlsen and Pauwels.

Accordingly, reconsideration and withdrawal of the rejection of claims 16-17 under 35 U.S.C. §103(a) over the purported combination of Carlsen and Pauwels are respectfully requested.

Claims 19-21 and 23-25 were rejected under 35 U.S.C. §103(a) based on Carlsen in view of Gupta. Applicant respectfully traverses this rejection for at least the following reasons.

Claim 19 recites, *inter alia*, "a first message for sending from a first port at which congestion is detected to an upstream port connected to the first port, the first message requesting establishment at the upstream port of a set aside queue for storing data packets received by the upstream switch destined for the source of congestion, the message including a token for storage by said upstream port, the protocol operating such that when said congestion clears, the established set aside queue is de-allocated and the corresponding token is passed downstream in the direction of the previously congested port."

The Examiner concedes that Carlsen does not disclose storing data packets received by the upstream switch destined for the source, the message including a token for storage by said upstream port congestion.

The Examiner contends that Gupta is relevant to a signalling protocol that requires the transmission of a token for storage by the upstream port. The Examiner refers specifically to the use of flags in Gupta as being relevant.

Claim 19 requires that the message includes a token for storage by the upstream port and the protocol operates such that when said congestion clears, the established set aside queue is de-allocated and the corresponding token is passed downstream in the direction of the previously congested port.

For example, in one embodiment, tokens are used to identify leaf nodes and to allocate of set aside queues (SAQs). For example, as described in paragraph [0098] of the specification, when congestion vanishes and a given SAQ that has been allocated for a certain period of time becomes empty, it is de-allocated if the corresponding port owns a token. The associated CAM line is also de-allocated. De-allocations are notified to downstream ports or switches and the tokens owned by the de-allocated set aside queue in the leaf node are sent back towards the downstream switch.

Clearly, neither Carlsen nor Gupta, alone or in combination, disclose, teach or even suggest the subject matter recited in claim 19. Therefore, Applicant respectfully submits that claim 19 is patentable over the purported combination of Carlsen and Gupta.

Claims 20-21 and 23-25 depend from claim 19. Therefore, claims 20-21 and 23-25 are patentable over the purported combination of Carlsen and Gupta by virtue of their dependence on claim 19 and for the additional subject matter recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 19-21 and 23-25 under 35 U.S.C. §103(a) over the purported combination of Carlsen and Gupta are respectfully requested.

Claim 22 was rejected under 35 U.S.C. §103(a) based on Carlsen in view of Pauwels. Applicant respectfully traverses this rejection for at least the following reasons.

Claim 22 depends from claim 20. Therfore, claim 22 is patentable over Carlsen by virtue of its dependence on claim 19.

Pauwels fails to overcome the deficiencies noted above in Carlsen. Pauwels does not disclose, teach or suggest, *inter alia*, "a first message for sending from a first port at which congestion is detected to an upstream port connected to the first port, the first message requesting establishment at the upstream port of a set aside queue for storing data packets received by the upstream switch destined for the source of congestion, the message including a token for storage by said upstream port, the protocol operating such that when said congestion clears, the established set aside queue is de-allocated and the corresponding token is passed downstream in the direction of the previously congested port," as recited in claim 19.

Consequently, neither Carlsen nor Pauwels, alone or in combination, disclose, teach or suggest the subject matter recited in claim 22. Therefore, Applicant respectfully submits that claim 22 is patentable over the purported combination of Carlsen and Pauwels.

Accordingly, reconsideration and withdrawal of the rejection of claim 22 under 35 U.S.C. §103(a) over the purported combination of Carlsen and Pauwels are respectfully requested.

Claims 26-28 and 35 were rejected under 35 U.S.C. §103(a) based on Carlsen in view of U.S. Pub. No. 2005/0147032 to Lyon *et al.* (hereinafter "Lyon") and further in view of Gupta. Applicant respectfully traverses this rejection for at least the following reasons.

Claim 26 recites, *inter alia*, "request generation means arranged to send a request to a further upstream port to request storage of data packets destined for the downstream congested port at said further upstream port when a threshold amount of data packets destined for the downstream congested port are stored in the storage."

For at least the reasons provided above with respect to claim 1, claim 26 is patentable over the combination Carlsen and Gupta. In addition, as conceded in the Office Action, Carlsen does not disclose in response to a request for storage of data packets destined for a downstream congested port, storing selected data packets, and request generation means arranged to send a request to a further upstream port to request storage of data packets

destined for the congested port at said further upstream port when a threshold amount of data packets are stored in the storage.

Lyon fails to cure the deficiencies noted above in the combination of Carlsen and Gupta. Lyon was relied upon as allegedly disclosing storage for, in response to a request for storage of data packets destined for a downstream congested port, storing selected packets. Applicant respectfully disagrees.

Lyon does not disclose, teach or suggest, inter alia, "request generation means arranged to send a request to a further upstream port to request storage of data packets destined for the downstream congested port at said further upstream port when a threshold amount of data packets destined for the downstream congested port are stored in the storage," as recited in claim 26.

Consequently, none Carlsen, Lyon or Gupta, alone or in combination, disclose, teach or suggest the subject matter recited in claim 26. Therefore, Applicant respectfully submits that claims 26 is patentable over the purported combination of Carlsen, Lyon and Gupta.

Claims 27 and 28 and 35 depend from claim 26. Therefore, Applicant respectfully submits that claims 26, 27 and 35 patentable over the purported combination of Carlsen, Lyon and Gupta by virtue of their dependence on claim 26 and for the additional subject matter recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 26-28 and 35 under 35 U.S.C. §103(a) over the purported combination of Carlsen, Lyon and Gupta are respectfully requested.

Claims 29-34 were rejected under 35 U.S.C. §103(a) based on Carlsen in view of Lyon and further in view of Gupta. Applicant respectfully traverses this rejection for at least the following reasons.

Claim 29 recites, *inter alia*, "a plurality of ingress ports for receiving data packets; a plurality of output ports for transmitting data packets; and, control means for selectively routing data packets received at one or more of the ingress ports to one or more of the egress ports; wherein at least one of the ingress ports or egress ports comprises storage for storing details of a congestion tree comprising at least three connected ports in which in use, the switch is located."

The Examiner concedes that Carlsen does not disclose at least one of the ingress ports or egress ports comprises storage for storing details of a congestion tree comprising at least

three connected ports in which in use, the switch is located. The Examiner contends that Lyon discloses at least one of the ingress ports or egress ports comprises storage for storing details of a congestion tree comprising at least three connected ports in which in use, the switch is located. Applicant respectfully disagrees.

The Examiner refers to paragraph [0020] of Lyon as disclosing at least one of the ingress ports or egress ports comprising storage for storing details of a congestion tree comprising at least three connected ports in which in use, the switch is located.

Contrary to Examiner contention, paragraph [0020] simply describes that the identification of a queue of a separate queuing device into which the packet is enqueueable. Applicant submits that there is absolutely no disclosure of a congestion tree including at least three connected ports. Rather, Lyon seems to require the storage of data related to connected ports, i.e. the port in question and the "separate queuing device."

There is simply no disclosure in Lyon of a congestion tree comprising at least three connected ports and in which in use, the switch is located.

Consequently, none of Carlsen, Lyon or Gupta, alone or in combination, disclose, teach or suggest the subject matter recited in claim 29. Therefore, Applicant respectfully submits that claim 29 is patentable over the purported combination of Carlsen, Lyon and Gupta.

Claims 30-34 depend from claim 29. Therefore, Applicant respectfully submits that claims 30-34 are also patentable over the purported combination of Carlsen, Lyon and Gupta by virtue of their dependence on claim 29 and for the additional subject matter recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 29-34 under 35 U.S.C. §103(a) over the purported combination of Carlsen, Lyon and Gupta are respectfully requested.

Claims 36-38 were rejected under 35 U.S.C. §103(a) based on Carlsen in view of Gupta. Applicant respectfully traverses this rejection for at least the following reasons.

Claims 36 recites, *inter alia*, "a first message for sending from a first port at which congestion is detected to an upstream port connected to the first port, the first message requesting storage of data packets received by said upstream port destined for the congested first port; and, a second message for sending by the upstream port to a port further upstream when a threshold amount of data packets destined for the congested first port have been

received and stored by the said upstream port, said message requesting storage of data packets destined for the congested first port received by said further upstream port."

For at least the reasons provided above with respect to claim 1, neither Carlsen nor Gupta, taken alone or in combination disclose, teach or suggest the subject matter recited in claim 36.

Neither Carlsen nor Gupta, alone or in combination, disclose, teach or suggest "a first message for sending from a first port at which congestion is detected to an upstream port connected to the first port, the first message requesting storage of data packets received by said upstream port destined for the congested first port; and, a second message for sending by the upstream port to a port further upstream when a threshold amount of data packets destined for the congested first port have been received and stored by the said upstream port, said message requesting storage of data packets destined for the congested first port received by said further upstream port," as recited in claim 36.

Therefore, Applicant respectfully submits that claim 36 is patentable over the purported combination of Carlsen and Gupta.

Claims 37 and 38 depend from claim 36. Therefore, claims 37 and 38 are patentable over the purported combination of Carlsen and Gupta by virtue of their dependence upon claim 36 and for the additional subject matter recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 36-38 under 35 U.S.C. §103(a) over the purported combination of Carlsen and Gupta are respectfully requested.

Claims 39-41 were rejected under 35 U.S.C. §103(a) based on Carlsen in view of Lyon and further in view of Gupta. Applicant respectfully traverses this rejection for at least the following reasons.

Claims 39 recites, *inter alia*, "an ingress port for receiving data packets from a network to which in use the end station is connected; an egress port for providing data packets to a network to which in use the end station is connected; in which the egress port includes means operable in use to receive a message from a downstream port, the message containing data relating to a congested port further downstream than the downstream port and a request to provide storage for data packets destined for the congested port further downstream."

For at least the reasons provided above with respect to claim 1, neither Carlsen nor Gupta, taken alone or in combination disclose, teach or suggest the subject matter recited in claim 39.

Neither Carlsen nor Gupta, alone or in combination, disclose, teach or suggest "an ingress port for receiving data packets from a network to which in use the end station is connected; an egress port for providing data packets to a network to which in use the end station is connected; in which the egress port includes means operable in use to receive a message from a downstream port, the message containing data relating to a congested port further downstream than the downstream port and a request to provide storage for data packets destined for the congested port further downstream.," as recited in claim 39.

Lyon fails to cure the deficiencies noted above in the combination of Carlson and Gupta. Lyon does not disclose, teach or suggest "an ingress port for receiving data packets from a network to which in use the end station is connected; an egress port for providing data packets to a network to which in use the end station is connected; in which the egress port includes means operable in use to receive a message from a downstream port, the message containing data relating to a congested port further downstream than the downstream port and a request to provide storage for data packets destined for the congested port further downstream," as recited in claim 39.

Consequently none of Carlsen, Gupta and Lyon, alone or in combination disclose, teach or suggest the subject matter recited in claim 39.

Therefore, Applicant respectfully submits that claim 39 is patentable over the purported combination of Carlsen, Lyon and Gupta.

Claims 40 and 41 depend from claim 39. Therefore, claims 40 and 41 are patentable over the purported combination of Carlsen and Gupta by virtue of their dependence upon claim 39 and for the additional subject matter recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 39-41 under 35 U.S.C. §103(a) over the purported combination of Carlsen, Lyon and Gupta are respectfully requested.

Claims 42-47 were rejected under 35 U.S.C. §103(a) based on Carlsen in view of Gupta and further in view of Lyon. Applicant respectfully traverses this rejection for at least the following reasons.

Claims 42-47 depend from claim 39. Therefore, Applicant respectfully submits that claims 42-47 are patentable over the purported combination of Carlsen, Gupta and Lyon by virtue of their dependence on claim 39 and for the additional subject matter recited therein.

Accordingly, reconsideration and withdrawal of the rejection of claims 42-47 under 35 U.S.C. §103(a) over the purported combination of Carlsen, Gupta and Lyon are respectfully requested.

CONCLUSION

Applicant has addressed the Examiner's rejections and respectfully submits that the application is in condition for allowance. A notice to that effect is earnestly solicited.

If any point remains in issue which the Examiner feels may be best resolved through a personal or telephone interview, please contact the undersigned at the telephone number listed below.

Please charge any fees associated with the submission of this paper to Deposit Account Number 033975. The Commissioner for Patents is also authorized to credit any over payments to the above-referenced Deposit Account.

Respectfully submitted,

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